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ON THE IDENTITY OF *PSEUDOTREMIA CAVERNARUM* COPE, A POORLY KNOWN AMERICAN CHORDEUMOID DIPLOPOD

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Uncritical reliance upon the authority of early workers has led many systematists into difficulty and this situation can hardly be better exemplified than by the history of the name *Pseudotremia cavernarum*. In this case the trouble started with the treatment of the species in the otherwise faultless "Craspedosomatidae of North America" (Cook and Collins, 1895), and has been perpetuated by workers who have recently dealt with the genus. In current usage the name is associated with a species entirely different from that upon which I believe Cope originally based it.

Ever since the spring of 1947, when I first encountered a member of the genus, I have been accumulating material for an eventual monographic treatment of *Pseudotremia*. Typical material of most of the known forms, as well as nearly a score of undescribed species, has been acquired, but the higher priority of several other projects makes it likely that several years may elapse before the revision will appear in print. For this reason it seems desirable to clarify the status of *cavernarum*—the type species of *Pseudotremia*—for the benefit of other investigators who may have to deal with the genus in one way or another.

The name *Pseudotremia* was proposed by E. D. Cope in 1869 to embrace two new millipeds which he collected in southwest Virginia as well as the species which H. C. Wood had described under the name *Spirostrephon caesioannulatus*. The genus thus originally contained three species, and the statement in the "Checklist of the millipeds of North America" (Chamberlin and Hoffman, 1958) that *cavernarum* is the generotype by monotypy is in error. Of Cope's new species, *vudii* was described from a single female without precise locality data but thought to be from Montgomery County, Virginia, while *cavernarum* was

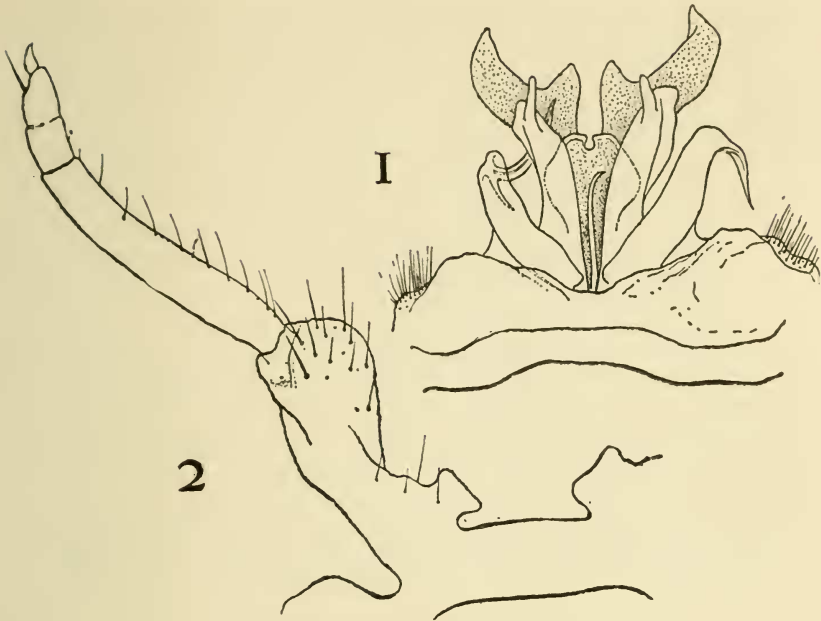
“. . . taken in Erhart's Cave, Montgomery County, and Spruce Run and Big Stony Caves, in Giles County," Virginia. In two subsequent papers (1870, 1872) Cope reported material under the name *P. cavernarum* from caves in east Tennessee and southern Indiana, additional Indiana records later being published by McNeill (1888) and Bollman (1888).

When Cook and Collins studied the American chordeumoids for their 1895 paper, their concept of *cavernarum* was drawn from material collected in Wyandotte and Marengo Caves, Crawford Co., Indiana. Oddly enough, they apparently did not challenge the validity of the earlier identifications of the Indiana population, which were made in the era before male genitalia were utilized as specific characters. In other respects the quality of the "Craspedosomatidae" was so high that it has set a standard of excellence yet to be equalled in American diplopod literature, and so far only one, somewhat misguided, dispute of its accuracy has arisen.

From the time of my first acquaintance with the genus, it has not seemed likely to me that a typically cavernicolous diplopod described from southwest Virginia would occur over such a wide geographic range as had been ascribed to it. Solution of the problem seemed to depend on relocating Cope's original localities, and upon taking up residence in Montgomery County, Virginia, in 1950, I set out to accomplish this. Numerous caves in both Montgomery and Giles counties were explored for millipeds, and it gradually became evident that the two caves named by Cope in the latter county were inhabited solely by a large, strongly pigmented species which has recently been described by Loomis (1944) under the name *Pseudotremia sublevis*. Although Cope had stipulated that his species was rather small and pallid, I assumed that (1) he may have had only immature specimens, and (2) that only one species occurred in the New River drainage basin including the two counties mentioned. On these somewhat tentative guesses, *sublevis* was reduced to synonymy under *cavernarum* in the "Checklist."

During the foregoing explorations, the location of Erhart's Cave was never ascertained, and it was not until 1957 that Dr. Thomas C. Barr, Jr., supplied me with the necessary details. A prompt investigation brought surprising results: a small bodied, colorless species which matches Cope's description exactly and which is almost certainly the original of *Pseudotremia cavernarum*. The cave which it inhabits is in the eastern half of Montgomery County, drained by the Roanoke River east into the Atlantic, and the species is trenchantly different from that of the New River drainage (*sublevis*) as well as from the population of southern Indiana.

It is now obvious that the records cited by Cook and Collins for *cavernarum* actually apply to four or more different species. As first reviser of the complex, I herewith restrict the type locality, from the three caves originally mentioned, to Erhart's Cave, in the village of Ellett, Montgomery County, Virginia. The name *sublevis* of Loomis is accordingly resurrected from its unwarranted sojourn into synonymy. The Indiana population described and figured by Cook and Collins has already received a new name, *Pseudotremia indianae*, in the "Checklist."



Pseudotremia cavernarum Cope
Figures 1, 2

Pseudotremia cavernarum Cope, 1869, Proc. Amer. Philos. Soc., vol. 11, p. 179.

The species is to be diagnosed primarily upon the shape of the gonopods and ninth legs, as illustrated, with the additional notes which follow as supplementary specific characters:

Size moderate for the genus, adults ranging from about 20 to 27 mm in length (specimens over 25 mm very scarce), and up to 1.8 mm in greatest diameter. The body shape is very slightly fusiform, the 6th and 7th segments being widest in males, but only a little broader than the adjoining segments.

Color varying from almost completely white to a pale yellowish tan, the pigment when present concentrated on the dorsal surface of the anteriormost segments, head and mandibles usually darkest; basal articles of antennae pigmented but the distal two always pure white. Lower sides and legs whitish-gray.

Texture of tergites nearly obliterated, the dorsolateral knobs so common to many forms of the genus are here only poorly defined longitudinal swellings, subtended on the sides by vague striation; surface of dorsum chiefly smooth. Dorsal setae very slender and acicular, instead of clavate.

Ocelli present in elongated triangular patches, usually about 15 in each, with only half or less of the ocelli pigmented.

Gonopods typical for the genus, in anterior aspect seen to have a wide

sternite and transversely elongate, mesially fused syncoxites, the latter densely setose laterally. Distal elements consist of two major divisions:

(1) two anterior bifid joints, the lateral branches of which are grooved, curving caudad and then mesiad, each with a small spur at about the midlength; the mesial branch projecting distad, with a smaller subapical process.

(2) a pair of large, basally fused flat plates (the "bifid laminae" of Cook and Collins) which carry a large zygomatic subcoarctate structure, itself subtended on the anterior side by a slender median aciculate process extending distad between the anterior elements of the gonopod.

Ninth legs as illustrated, the second joint rather long and slender, the two distalmost joints very indistinctly segmented and in some specimens not clearly set off from the second.

Although the gonopods appear at first glance to represent a unique development in the Cleidogonidae, they are in actuality not greatly removed from the form typical of *Cleidogona*. The "bifid laminae" emphasized by Cook and Collins as diagnostic of *Pseudotremia* are actually homologous with the somewhat smaller and separate posterior processes of the gonopod of *Cleidogona*, which are likewise held by the coxal lobes of the 9th legs when at rest, just as in *Pseudotremia*. The latter genus, to be sure, has become much more specialized in gonopod structure, but the morphological similarities are clear. A precise terminology is still in a developmental stage, pending completion of detailed anatomical studies, so that no specific descriptive names are introduced at this time.

It is a matter of interest that no one has heretofore observed or remarked the presence of the zygomatic structure formed by the posterior laminae of the gonopods, for it is present in most of the species which I have studied, its shape varying with the different forms. The median spine is likewise present in most species, although often quite short and not readily visible. In some, such as *P. indianae*, the process is very long and distally bifid.

The outer member of the anterior division of the gonopods is distinctly grooved or channeled, and presumably functions as a form of solenomerite, although this development must be quite rare in the suborder Chordeumidea. I have so far been unable to detect a basal gland or duct through gross dissections, but at this writing am preparing sectioned material for a more precise microscopic study of the situation. A similar grooving of the gonopod appears not to be present in the genus *Cleidogona*, but does occur in the Guatemalan *Solaenogona*.

Pseudotremia cavernarum has not yet been found elsewhere than the type locality. The material at hand consists of males and females cataloged under numbers 6991, April 25, 1957, and 7285, April 8, 1958.

The following two citations are of the closest interest to the history of *P. cavernarum*; the others cited in the text can be located, by the date cited, in the bibliography accompanying the recently published "Checklist of the millipeds of North America" (U. S. Nat. Mus. Bull. No. 212, 1958).

REFERENCES

- Cook, Orator F., and G. N. Collins. 1895. The Craspedosomatidae of North America. *Ann. New York Acad. Sci.*, vol. 5, pp. 1, figs. 1-100.

Cope, Edward D. 1869. Synopsis of the extinct Mammalia of the cave formations of the United States, with observation on some Myriapoda found in and near same. Proc. Amer. Philos. Soc., vol. 11, pp. 171-192.

Figures 1, 2. *Pseudotremia cavernarum* Cope, from male topotype. 1, anterior aspect of gonopods, the accessory posterior elements lightly stippled. 2, ninth leg and part of sternum, caudal aspect (figures drawn to same scale).